CLAIMS

What is claimed is:

1. A method of exchanging data at a first rate between first and second point-to-point entities coupled in a wide area network by a plurality of connections through which data travels at a second rate, the first rate being greater than the second rate, the method comprising the steps of:

parsing, at the first entity, data frames traveling at the first rate into a plurality of data frames traveling at the second rate;

sending the plurality of data frames to the second entity via the plurality of connections;

receiving and buffering the plurality of data frames at the second entity; and

multiplexing the plurality of data frames into data frames traveling at the first rate.

2. The method of claim 1, wherein the plurality of connections includes associated buffers at the first entity, and wherein the parsing step comprises the steps of:

determining for successive buffers whether a predetermined threshold storage quantity exceeds the number of data bytes stored in the buffer;

selecting the first buffer determined to contain less data bytes than the predetermined threshold storage quantity;

placing a data frame into the selected buffer; and

repeating the determining, selecting, and placing steps as necessary to exchange all of the data between the first and second point-to-point entities.

3. The method of claim 2, further comprising the step of ascertaining whether each buffer is associated with a functioning connection.

4. The method of claim 2, wherein the buffers are FIFOs.

5. The method of claim 2, wherein the connections are standardized E1/T1 lines and the wide area network is a telecommunication system.

6. The method of claim 2, wherein the connections are standardized Internet Protocol lines for data transfer.

7. The method of claim 2, wherein the connections are standardized Asynchronous Transfer Mode lines.

8. The method of claim 2, wherein the first entity is a base station controller, the second entity is a base station transceiver subsystem, and the wide area network is part of a wireless telecommunication system.

9. The method of claim 2, wherein the first entity is a base station transceiver subsystem, the second entity is a base station controller, and the wide area network is part of a wireless telecommunication system.

10. The method of claim 2, further comprising the step of removing data frames from the buffers at a constant data rate for transmission on the connections, and wherein the placing step is performed periodically at a rate equal to the constant data rate multiplied by the number of buffers.

11. The method of claim 2, wherein the predetermined threshold storage quantity is sixteen bytes.

12. An interface for transmitting digital data across multiple connections between first and second point-to-point entities in a wide area network, comprising:

a frame-based inverse multiplexer residing in the first entity for placing digital data frames traveling at a first frame rate onto the multiple connections between the first and second entities at a second frame rate, the first frame rate being greater than the second frame rate; and

a receiver residing in the second entity for buffering and multiplexing to the first frame rate the digital data frames received from the multiple connections between the first and second entities,

wherein the first frame rate is an effective transfer rate between the first and second entities for a given group of digital data frames.

13. The interface of claim 12, wherein the frame-based inverse multiplexer comprises:

a plurality of buffers, each buffer being coupled to a respective connection; and

a frame distribution logic circuit coupled to the plurality of buffers for successively distributing data frames to each buffer that satisfies a predetermined capacity constraint and is coupled to a functioning connection.

14. The interface of claim 13, wherein the plurality of buffers comprises a plurality of FIFOs.

15. The interface of claim 12, wherein the multiple connections are standardized E1/T1 lines and the wide area network is a telecommunication system.

16. The interface of claim 12, wherein the multiple connections are standardized Internet Protocol lines for data transfer.

17. The interface of claim 12, wherein the multiple connections are standardized Asynchronous Transfer Mode lines.

18. The interface of claim 12, wherein the first entity is a base station controller, the second entity is a base station transceiver subsystem, and the wide area network is part of a wireless telecommunication system.

19. The interface of claim 12, wherein the first entity is a base station transceiver subsystem, the second entity is a base station controller, and the wide area network is part of a wireless telecommunication system.

20. The interface of claim 13, wherein the predetermined capacity constraint is satisfied if a particular buffer contains less than sixteen bytes.

21. An interface for exchanging data at a first rate between first and second point-to-point entities coupled in a wide area network by a plurality of connections through which data travels at a second rate, the first rate being greater than the second rate, the interface comprising:

means for parsing, at the first entity, data frames traveling at the first rate into a plurality of data frames traveling at the second rate;

means for sending the plurality of data frames to the second entity via the plurality of connections;

means for receiving and buffering the plurality of data frames at the second entity; and

means for multiplexing the plurality of data frames into data frames traveling at the first rate.

22. The interface of claim 21, wherein the plurality of connections includes associated buffers at the first entity, and wherein the means for parsing comprises:

means for determining for successive buffers whether a predetermined threshold storage quantity exceeds the number of data bytes stored in the buffer;

means for selecting the first buffer determined to contain less data bytes than the predetermined threshold storage quantity; and

means for placing a data frame into the selected buffer.

23. The interface of claim 22, further comprising means for ascertaining whether each buffer is associated with a functioning connection.

24. The interface of claim 22, wherein the buffers are FIFOs.

25. The interface of claim 22, wherein the connections are standardized E1/T1 lines and the wide area network is a telecommunication system.

26. The interface of claim 22, wherein the connections are standardized Internet Protocol lines for data transfer.

27. The interface of claim 22, wherein the connections are standardized Asynchronous Transfer Mode lines.

28. The interface of claim 22, wherein the first entity is a base station controller, the second entity is a base station transceiver subsystem, and the wide area network is part of a wireless telecommunication system.

29. The interface of claim 22, wherein the first entity is a base station transceiver subsystem, the second entity is a base station controller, and the wide area network is part of a wireless telecommunication system.

30. The interface of claim 22, further comprising means for removing data frames from the buffers at a constant data rate for transmission on the connections, and wherein the means for placing comprises means for periodically placing data frames into buffers at a rate equal to the constant data rate multiplied by the number of buffers.

31. The method of claim 22, wherein the predetermined threshold storage quantity is sixteen bytes.

32. A method of inverse multiplexing data frames arriving sequentially at a plurality of buffers coupled to transmission lines, the method comprising the steps of:

determining for successive buffers whether a predetermined threshold storage quantity exceeds the number of data bytes stored in the buffer;

selecting the first buffer determined to contain less data bytes than the predetermined threshold storage quantity; and

placing the next arriving data frame into the selected buffer.

33. The method of claim 32, further comprising the step of ascertaining whether each buffer is coupled to a functioning transmission line.

34. The method of claim 32, wherein the buffers are FIFOs.

35. The method of claim 32, wherein the transmission lines are standardized E1/T1 lines in a telecommunication system.

36. The method of claim 32, wherein the transmission lines are standardized Internet Protocol lines for data transfer.

37. The method of claim 32, wherein the transmission lines are standardized Asynchronous Transfer Mode lines.

38. The method of claim 32, further comprising the step of removing data frames from the buffers at a constant data rate for transmission on the transmission lines, and wherein the placing step is performed periodically at a rate equal to the constant data rate multiplied by the number of buffers.

39. The method of claim 32, wherein the predetermined threshold storage quantity is sixteen bytes.

40. A method of inverse multiplexing data frames arriving sequentially at a plurality of buffers coupled to transmission lines, the method comprising the steps of:

determining the amount of stored frame data in each one of the plurality of buffers;

selecting the buffer determined to contain the least amount of stored frame data; and

placing the next arriving data frame into the selected buffer.

41. The method of claim 40, further comprising the step of ascertaining whether each buffer is coupled to a functioning transmission line.

42. The method of claim 40, wherein the buffers are FIFOs.

43. The method of claim 40, wherein the transmission lines are standardized E1/T1 lines in a telecommunication system.

44. The method of claim 40, wherein the transmission lines are standardized Internet Protocol lines for data transfer.

45. The method of claim 40, wherein the transmission lines are standardized Asynchronous Transfer Mode lines.

46. The method of claim 40, further comprising the step of removing data frames from the buffers at a constant data rate for transmission on the transmission lines, and wherein the placing step is performed periodically at a rate equal to the constant data rate multiplied by the number of buffers.

47. A method of removing data frames from a plurality of buffers coupled to transmission lines, the method comprising the steps of:

determining for each successive whether the number of data bytes stored in the buffer exceeds a predetermined threshold storage quantity; and

removing a data frame from the first buffer determined to contain more data bytes than the predetermined threshold storage quantity.

48. A method of removing data frames from a plurality of buffers coupled to transmission lines, the method comprising the steps of:

determining the amount of stored frame data in each one of the plurality of buffers; and

removing a data frame from the buffer determined to contain the greatest amount of stored frame data.

49. A method of removing data frames from a plurality of buffers coupled to transmission lines, the method comprising the steps of:

determining the amount of stored frame data in successive buffers until one of the buffers is determined to contain at least one frame of stored data; and

removing the frame from the first buffer determined to contain at least one frame of stored data.